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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,279	06/26/2003	Demetrius Sarigiannis	MI22-2264	8299
21567	7590	06/14/2004	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			NHU, DAVID	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/609,279

Applicant(s)

SARIGIANNIS ET AL.

Examiner

David Nhu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 1-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTIONS

1. Claims 40-49 are present for examination.

#### Drawings

2. There is no description of (106) in figure 5.

#### Abstract

3. The abstract of the disclosure is objected to because legal phraseology such as "**comprise**" is used. Correction is required. See MPEP & 608.01(b).

#### Claims Objection

4. Claim 40, line 10, "raising the temperature" should be --raising the **threshold** temperature-- because it lacks a clear antecedent basis.

Claim 41, "form the layer on the substrate" should be--form **a** layer on the substrate-- because it lacks a clear antecedent basis.

Claim 42, "th precursor" should be --the precursor-- ; "an interfac" should be--an interface--

Claim 43, "**the** surface composition", "as **the** layer on the substrate" lack a clear antecedent basis.

Claim 44, "where the temperature of the mixture" should be--where the **threshold** temperature of the mixture--

#### Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 40-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Background of Invention (BOI) in view of Farrar (6,413,827 B2).

**Regarding claim 40**, BOI, (see pages 1-2), teach a method of forming at least one trenched isolation region, comprising providing a semiconductor substrate within a reaction chamber, the substrate having at least one trench extending therein.

It is not that BOI fails to teach the steps of providing a mixture within the chamber, the mixture comprising a precursor of an electrically insulative material within a supercritical fluid, the precursor being reactive at or above a threshold temperature to form the electrically insulative material, the mixture being initially provided within the reaction chamber at a temperature below the threshold temperature; raising the threshold temperature of at least some of the mixture to a temperature of at least the threshold temperature to form the electrically insulative material within the at least one trench.

However, Farrar, (see figures 1A-1J, col. 6, lines 30-67, col. 7, 8, lines 1-67, col. 9, lines 1-25), teach the steps of providing a mixture MSSQ within the chamber, the mixture comprising a precursor of an electrically insulative material within a supercritical fluid (see figure 1E, col. 7, lines 39-51), the precursor being reactive at or above a threshold temperature to form the electrically insulative material, the mixture MSSQ being initially provided within the reaction chamber at a temperature below the threshold temperature; raising the threshold temperature of at least some of the mixture to a temperature of at least the threshold temperature to form the electrically insulative material 160 within the at least one trench 150 (see col. 7, lines 5-16) Regarding claims 41-47, (see col. 5, lines 17-50, col. 6, lines 30-67, col. 7, lines 1-67), also teach the reaction of the precursor to form the electrically insulation material occurs in the

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mixture, at an interface of the supercritical liquid and a surface of the substrate; wherein the precursor reacts with a surface composition at or above the threshold temperature to form the electrically insulation material as a layer on the substrate; wherein the threshold temperature of the mixture is heating/curing the substrate and transferring heat from the substrate to the mixture; wherein the precursor comprises silicon and oxygen and wherein the electrically insulation material is silicon oxide/dioxide.

Regarding claims 48-49, BOI, (see page 2), teach also the precursor is tetraethyl orthosilicate and tris(tertbutoxy)silanol.

It would have been obvious to one having ordinary skill in the art at the time of the present invention to apply the teachings of Farrar into BOI as both are related to the same subject matter of forming a trench or isolation trench in a reaction chamber with a precursor having an electrical insulation material and a supercritical fluid at a temperature below a threshold temperature.

### **Conclusion**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Farrar'723, Farrar'792, Tanaka'834, Zhao'906 are cited as of interest.

8. A shortened statutory period for response to this action is set to expired 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).

10. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor,


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David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956*

David Nhu



June 8, 2004